

## CLAIMS

### WE CLAIM AS OUR INVENTION:

1. A method of processing medical image data comprising:  
receiving data indicative of a group of consecutive cross sectional images of a three dimensional volume being imaged, each of the cross sectional images being perpendicular to a z-axis, the group of consecutive cross sectional images having a first axial resolution in a z-axis direction and having a first spatial resolution in x-axis and y-axis directions orthogonal to the z-axis; and  
transforming the group of consecutive cross sectional images in the z-axis direction to generate an axially transformed representation of the group, the axially transformed representation having a second axial resolution lower than the first axial resolution.
2. The method of claim 1, further comprising generating reconstruction data to allow reconstruction of the group from the axially transformed representation.
3. The method of claim 2, further comprising:  
providing the axially transformed representation to a viewer; and  
progressively providing the reconstruction data to allow reconstruction of the group at the first axial resolution.
4. The method of claim 1, wherein transforming the group of consecutive cross sectional images further comprises performing a wavelet transform on the data.
5. The method of claim 1, further comprising performing entropy encoding of the axially transformed representation.

6. The method of claim 1, further comprising transforming the axially transformed representation in x-axis and y-axis directions to generate a spatially transformed representation of the axially transformed representation, the spatially transformed representation having a second spatial resolution lower than the first spatial resolution.

7. The method of claim 6, wherein transforming the axially transformed representation further comprises performing a compression technique selected from the group consisting of a wavelet transform and a differential pulse code modulation prediction.

8. The method of claim 6, further comprising:  
providing the spatially transformed representation to a viewer; and  
progressively providing information to allow reconstruction of the spatially transformed representation.

9. The method of claim 6, further comprising performing entropy encoding of the spatially transformed representation.

10. A method of processing medical image data comprising:  
providing a first representation of a group of cross sectional images transformed in an axial direction, the first representation having a first axial resolution and a first spatial resolution to allow selection of the group of cross sectional images; and  
progressively providing a second representation of the cross sectional images, the second representation having a second axial resolution comparatively greater than the first axial resolution to provide comparatively greater axial detail than an axial detail of the first representation.

11. The method of claim 10, further comprising providing a third representation by transforming the first representation in a spatial direction, the third representation having a transformed spatial resolution comparatively less than the first spatial resolution.

12. A method of processing medical image data comprising:  
receiving data indicative of images representing consecutive cross sections of a three dimensional volume being imaged, the cross sections being perpendicular to a z-axis;

transforming, in one dimension, a plurality of the images in a z-axis direction to generate a first transformed representation of the three dimensional volume; and

transforming, in two dimensions, the first transformed representation in an x-axis direction orthogonal to the z-axis direction and a y-axis direction orthogonal to the z-axis to generate a second transformed representation of the three dimensional volume.

13. The method of claim 12, wherein transforming in one dimension further comprises performing at least one level of wavelet decomposition.

14. The method of claim 12, wherein transforming in two dimensions further comprises performing at least one level of wavelet decomposition.

15. The method of claim 12, further comprising performing entropy encoding of at least one of the group consisting of the first transformed representation and the second transformed representation.

16. The method of claim 15, wherein performing entropy encoding further comprises Huffman encoding.

17. The method of claim 16, wherein Huffman encoding further comprises creating a Huffman look up table.

18. The method of claim 12, further comprising generating a data stream comprising information for progressively reconstructing the second transformed representation, followed by information for progressively reconstructing the first transformed representation.

19. The method of claim 18, wherein the data stream further comprises an entropy decoding table for decoding entropy encoded data.

20. The method of claim 18, further comprising progressively extracting at least a portion of the information from the data stream according to a desired level of viewing detail of the three dimensional volume.

21. The method of claim 18, further comprising reconstructing the second transformed representation, then reconstructing the first transformed representation to achieve a desired level of viewing detail of the three dimensional volume.

22. An apparatus for processing medical image data comprising:  
a processor module configured to receive data indicative of a group of consecutive cross sectional images of a three dimensional volume being imaged, each of the cross sectional images being perpendicular to a z-axis, the group of consecutive cross sectional images having a first axial resolution in a z-axis direction and having a first spatial resolution in x-axis and y-axis directions orthogonal to the z-axis; and

a processor module configured to compress the group of consecutive cross sectional images in the z-axis direction to generate an axially transformed representation of the group, the axially transformed representation having a second axial resolution lower than the first axial resolution.